**Before the**
**FEDERAL COMMUNICATIONS COMMISSION**
**Washington, D.C. 20554**

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| In the Matter of | ) | |
| | ) | |
| Redesignation of the 17.7 – 19.7 GHz Frequency Band, | ) | IB Docket No. 98-172 |
| | ) | |
| Blanket Licensing of Satellite Earth Stations in the 17.7 – 20.2 GHz and 27.5 – 30.0 GHz Frequency Band, and | ) | RM Docket No. 9005 |
| | ) | |
| the Allocation of Additional Spectrum in the 24.75 – 25.25 GHz Frequency Bands for Broadcast Satellite Service Use | ) | RM Docket No. 9118 |

# COMMENTS OF DIRECTV ENTERPRISES, INC.

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November 19, 1998

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**COMMENTS OF DIRECTV ENTERPRISES, INC.**

DIRECTV Enterprises, Inc. ("DIRECTV")[1] hereby submits its comments in response to the Commission's Notice of Proposed Rulemaking ("Notice") in the above-captioned proceeding.

## I. INTRODUCTION & SUMMARY

As the operator of America's premier direct broadcast satellite ("DBS") service, DIRECTV strongly supports the allocation of the 17.3 - 17.8 GHz band for Broadcast Satellite Service ("BSS") downlinks,[2] as well a portion of the 24 GHz band to the Fixed-Satellite Service ("FSS") for BSS feeder uplinks, on an exclusive, primary basis. DIRECTV has a pending expansion system application designed specifically to

1 DIRECTV Enterprises, Inc. is a licensee in the DBS service and a wholly-owned subsidiary of Hughes Electronics Corporation.

2 BSS is known as DBS in the United States, and the terms are used herein interchangeably.

take advantage of such a spectrum allocation.[3] As DIRECTV stated in that application, and in its accompanying Petition for Rulemaking,[4] the allocation is essential to accommodate the rapid growth of DBS service in the United States. The Commission is absolutely correct in acknowledging U.S. DBS operators' need for additional spectrum in the next decade,[5] and it is in the public interest for the Commission to begin the allocation process *now* in order to permit DBS operators to plan and to secure funding for next-generation BSS satellite systems, with the requisite assurance that such systems will operate in an environment free from interference from terrestrial fixed service ("FS") and other satellite or feeder link operations.

More generally, as a geostationary satellite operator ("GSO"), DIRECTV supports the allocation of 1000 MHz of clear spectrum for broadband GSO Fixed Satellite Service ("FSS") uses, as DIRECTV's affiliated companies have urged.[6] There is a well-established need for the GSO FSS to have access to 1000 MHz of unencumbered spectrum at Ka band for use by small, ubiquitously deployed terminals. The Commission should address that need. In addition, the Commission should ensure that any rules imposed with respect to blanket licensing in the Ka band do not unnecessarily preclude other uses of the Ka band by GSO satellite operators, such as direct-to-home ("DTH") services that do not operate and are not licensed under a VSAT regulatory paradigm.

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3 Application of DIRECTV Enterprises, Inc. for Authority to Construct, Launch and Operate an Expansion System of Direct Broadcast Satellites (June 5, 1997) ("Expansion Application").

4 Petition of DIRECTV Enterprises, Inc. to, Amend Parts 2, 25 and 100 of the Commission's Rules to Allocate Spectrum for the Fixed-Satellite Service and the Broadcasting-Satellite Service. RM No. 9118 (filed June 5, 1998) ("DIRECTV Petition").

5 *Notice* at ¶ 79.

6 *See* Comments of Hughes Electronics, Inc., also being filed today.

## II. THE COMMISSION SHOULD ALLOCATE THE 17.3 – 17.8 GHz BAND FOR BSS DOWNLINKS.

In its Petition for Rulemaking that in part led to this proceeding, DIRECTV urged the Commission to allocate the 17.3 - 17.8 GHz band for BSS downlinks.[7] That allocation is in the public interest, and should occur *now*, even if BSS operators are not actually permitted to *use* the spectrum until 2007 out of deference to the operational needs of the U.S. Government and the Department of Defense ("DoD"). Given the tremendous cost involved and long lead time necessary to plan and deploy satellite systems, a reservation today of the band for primary BSS operations will give BSS operators the certainty of having clear spectrum for planning and investment purposes, and will also give current co-primary terrestrial users a suitable period of time to transition their operations out of the band. At a minimum, the Commission cannot continue to license terrestrial systems on a primary or co-primary basis at 17.3 - 17.8 GHz if the band realistically is to remain viable for the deployment of BSS operations. Thus, any further licensing of terrestrial systems in this band should occur on a secondary basis only, if at all.

### A. The Proposed Allocation Of The 17.3 - 17.8 GHz Band for BSS Downlink Operations Is In The Public Interest

The public interest will be well served if the Commission allocates the 17.3 – 17.8 GHz band for exclusive primary use by BSS operators. DBS is one of the fastest-growing consumer services in history; in just four years of operation, DIRECTV alone has attracted more than 4.1 million subscribers. Furthermore, it is not likely that the demand for additional BSS spectrum can be met within the constraints of the ITU's BSS Plan for Region 2, since only three orbital locations are available to the United

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7 DIRECTV Petition at 7-8.

States in the 12.2 - 12.7 GHz band (the "Planned BSS Band")[8] for BSS service that provide the optimal antenna elevation angles from all 48 contiguous states ("CONUS"). All of the available channels at those three locations are already licensed by the Commission, and U.S.-licensed BSS systems are now operating in two of the three locations.[9] Thus, the *Notice* correctly observes that BSS is "a rapidly growing service," requiring "additional spectrum" for "the next decade."[10]

The growing demand for additional BSS capacity is being fueled by a number of factors. First, the amount and variety of available video programming, and the subscriber demand for a wider variety of programming, increase dramatically every year. Additional capacity is required to integrate such programming into DIRECTV's existing DBS business.

Moreover, the trend toward higher technical quality, in part fueled by the transition of terrestrial broadcast television to digital technology, demands more and more satellite transmission capacity. DIRECTV expects to use its proposed expansion system to deliver programming in NTSC (transported digitally) and standard-definition and high-definition ATSC formats. The ATSC streams will be encapsulated with modulation and coding appropriate for satellite transmission.

Increased video capacity is needed both to increase the number of channels and to improve the technical quality of each channel available to subscribers, who will come to expect increased technical quality as they are increasingly exposed to digital satellite and cable services, Digital-VHS, Digital Versatile Disk and digital terrestrial

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8 This band is the downlink band used today by U.S. DBS operators.

9 DIRECTV is the licensee of 27 of the 32 channels at 101° W.L.; United States Satellite Broadcasting Co., Inc. ("USSB") is the licensee of the remaining 5 channels there. Echostar and its affiliates are operating from 119° W.L. TSAT has launched a satellite with an intent for it or PRIMESTAR to offer DBS service from that location as well. 28 channels at 110° W.L. are licensed to MCI Communications Corp., although no DBS service has yet been deployed from that orbital position.

10 *Notice* at ¶ 79.

broadcasting. Although DIRECTV has improved both the quantity and quality of its video transmissions by signal processing improvements, future major improvements must rely on access to additional capacity.

In addition, the evolution of terrestrial broadcasting from NTSC to the ATSC formats will be a complex and expensive undertaking for broadcasters, television set manufacturers and consumers. DIRECTV can facilitate this transition by broadcasting ATSC format signals on a nationwide basis. Because one ATSC signal consumes the capacity of nearly an entire transponder, DIRECTV requires access to more capacity to be a significant force in the national rollout of ATSC. Indeed, supporting these types of advanced signal transmissions was one of the original purposes of allocating the 17.3 - 17.8 GHz and a corresponding portion of the 24 GHz band for BSS use.

BSS service providers, such as DIRECTV, also increasingly are tailoring their programming offerings to serve multiple demographic groups, adding foreign language and special interest programming, which further fuels demand for BSS services. Furthermore, as business and educational needs begin to require digital services, increased capacity will be required to support a variety of business information and distance-learning applications.[11]

Finally, an entirely new programming category of Internet-like "multimedia" services has become an important part of BSS delivery plans in the United States. This demand also will strain the capacity of today's bandwidth-limited BSS systems.

The 17.3 - 17.8 GHz downlink band, and the corresponding allocation of FSS feeder uplink capacity at 24 GHz, provide a unique opportunity to meet the growing needs for BSS capacity with new, economically practical technology that is

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11 *See* 47 U.S.C. § 335.

available today to provide this service.[12] Other GSO operators such as GE Americom, Lockheed Martin and Loral have acknowledged the public interest benefit of such an allocation.[13] For continued innovation to occur, and particularly for the development of next-generation BSS services, BSS operators must be able to rely on an additional allocation of spectrum dedicated to their exclusive, primary use.

Granting BSS operators the exclusive use of additional spectrum at 17 GHz also is in the public interest because it will increase competition in the market for the delivery of multichannel video programming. The Commission has observed that the current multichannel video market structure is not competitive.[14] In its annual assessment of competition in the market for video programming, the Commission found that 87% of subscribers to multichannel video programming distribution ("MVPD") receive service from their franchised cable operator.[15] DBS has been recognized as the MVPD service that offers the greatest prospect of successful competition with cable television.[16] To facilitate the development of BSS service providers as competitors to incumbent cable multiple system operators ("MSOs"), the Commission should support the continued growth of BSS by allocating additional spectrum to address expanding consumer demand for BSS services.

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12 Use of the 17.3 - 17.8 GHz band for BSS is not constrained by the orbital spacing provisions of the ITU's Region 2 plan. DIRECTV believes that it will be possible to use orbital spacing in this band as close as 4.5 degrees and still provide service to antennas 18 inches in diameter without the need for breakthroughs in ground antenna technology. The FCC's policy of two degree spacing for satellites in the FSS service effectively limits receive FSS antennas in the 17.7 - 20.2 GHz band to 26 inches in diameter.

13 *Notice* at ¶ 75.

14 *See In the Matter of Annual Assessment of the Status of Competition in Markets for the Delivery of Video Programming, Fourth Annual Report,* CS Docket No. 97-141, FCC No. 97-423 (rel. Jan. 13, 1998).

15 *Id.* at ¶ 7.

16 *Id.* at ¶ 11.

### B. The Commission Should Allocate The 17.3 – 17.8 GHz Band For Exclusive Primary BSS Use *Now*, Even If BSS Operators May Not Be Authorized To Operate Systems Using The Band Until 2007

DIRECTV strongly believes that the Commission should not wait until 2007 to allocate the 17.3 – 17.8 GHz band for BSS downlink use. Mindful of the requirements of the U.S. Government and the DoD, DIRECTV understands the potential need to restrict actual BSS operations in the band before 2007.[17] However, the Commission can and should allocate the spectrum for exclusive, primary use by the DBS service now, and plan to proceed promptly with the promulgation of service rules and the licensing of BSS systems to use that spectrum. BSS operators must be given the requisite assurance by the Commission of their ability to use the band so that they can allocate their resources more effectively and plan for the use of the spectrum in 2007. It is in the public interest for the Commission to ensure, from a regulatory standpoint, that no Commission-created uncertainty creates a delay in BSS operators being able to deploy their systems and fully utilize 17.3 - 17.8 GHz frequencies as soon as possible.

Specifically, an exclusive primary BSS allocation is required to reserve spectrum for BSS use before the band is further populated on a wide-scale basis by additional terrestrial systems. The Commission has acknowledged that BSS/FS sharing may not be feasible.[18] Indeed, the FCC has expressly highlighted the importance of clear

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17 *See Notice* at ¶ 79.

18 *Id.* at ¶ 18 (citing *Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5 – 29.5 GHz Frequency Band, to Reallocate the 29.5 – 30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services, First Report and Order and Fourth Notice of Proposed Rulemaking*, CC Docket No. 92-297, 11 FCC Rcd 19005 (1996)).

spectrum, and the corresponding impracticality of sharing spectrum with terrestrial services, for satellite-based services for which there will be "large numbers of ubiquitously deployed small antenna earth stations."[19] Significantly, of all the satellite interests before the Commission in this proceeding, BSS is the *only* service that actually has initiated such ubiquitous deployment of small dish antennas. And if the Commission is truly interested in creating additional usable capacity for next-generation BSS systems, it should take measures *today* to protect the 17.7 - 17.8 GHz band for BSS use.[20] The Commission should not permit the band's utility for BSS operations to be irrevocably eroded by the time the year 2007 has arrived.

An exclusive primary allocation of the 17.7 - 17.8 GHz bands for the BSS in 1999 for operational use in 2007 is consistent with the approach that the Commission has previously taken with respect to BSS/FS sharing issues. At 12 GHz, the Commission halted licensing of terrestrial fixed operations in the 12 GHz band in 1983 (one year after it authorized DBS service on a primary basis), and began taking measures to transition existing 12 GHz terrestrial fixed microwave users out of the band,[21] even though the first

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19 *Id.* at ¶ 19.

20 DIRECTV notes that the Commission has designated the 17.7 - 17.8 GHz band as a possible downlink band for GSO FSS satellites. Although co-primary FSS and BSS downlink uses are compatible, both uses cannot occur in the same band at the same orbital location (or nearby orbital locations). As noted in the DIRECTV Petition, no U.S.-licensed GSO FSS system has requested operating authority at 17.7 - 17.8 GHz in the United States, and there is no reason to believe this band will be needed by the GSO FSS for U.S. service. DIRECTV Petition at 10. There accordingly is no need to continue any allocation in the band for that purpose.

21 *See* Initiation of Direct Broadcast Satellite Service -- Effect on 12 GHz Terrestrial Point-to-Point Licensees in the Private Operational Fixed Radio Service, *Public Notice*, 10 FCC Rcd 1211 (1994 "12 GHz Public Notice"); *DBS First Report and Order*, 48 Fed. Reg. 50722 (1983).

satellite designed to provide DBS service was not launched until 1994. Furthermore, the Commission has always acknowledged the long lead time that attends satellite system planning and construction.[22]

Continuing to allow terrestrial systems to proliferate in the top 100 MHz of the 17 GHz band will substantially increase the potential for interference into future BSS operations in that band segment, and will make any definitive planning of BSS system deployment exceedingly difficult, if not impossible. Extensive delays in BSS system planning for this band segment will increase uncertainty regarding the viability of BSS system deployment in the band. Most importantly, delay in allocating the band to BSS would inevitably delay implementation and distribution of expanded, innovative BSS services to consumers. In addition, delaying the allocation would introduce investment uncertainty, which can be devastating for a young service such as DBS. In short, postponement of the allocation ultimately could diminish entirely the utility of the band for BSS operators.

Accordingly, DIRECTV recommends that the following steps be taken. First, for the reasons stated, the Commission should promptly allocate the 17.3 - 17.8 GHz band for BSS downlinks, even if a use restriction is imposed that would not permit actual BSS system operation until U.S. Government and/or DoD concerns are alleviated or the year 2007, whichever is earlier. Second, the Commission should, retroactive to the

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22 *See, e.g.*, Establishment of Rules and Policies for the Digital Audio Radio Service in the 2310 - 2360 MHz Frequency Band, 12 FCC Rcd 5754 (1997) (recognizing long lead time involved in constructing and launching a satellite system); Amendment of the Commission's Rules to Allocate Spectrum for, and to Establish Other Rules and Policies Relating to, a Radiodetermination Satellite Service, 104 FCC 2d 650 (1986) (same); RCA American Communications, Inc., 94 FCC 2d 441 (1983) (same).

date of the *Notice*, cease licensing terrestrial systems in the 17.7 - 17.8 GHz band. At the very least, to the extent any new terrestrial stations are nonetheless licensed at 17 GHz, they must operate on a strict secondary basis (as microwave users have done at 12 GHz since 1983) with the clear understanding that BSS systems will be entitled to interference protection as primary users of the band immediately upon deployment.

Finally, as a matter of fairness, DIRECTV does not oppose the operations of current terrestrial users of 17 GHz spectrum being grandfathered on a co-primary basis and gradually transitioned out of the band. Such systems will be protected by the power flux density ("PFD") limits in Part 25 of the Commission's rules with which BSS operators already must comply.[23] DIRECTV proposes that any such grandfathered terrestrial systems be granted co-primary status through April 1, 2007, which will give such systems more than ample opportunity to relocate their terrestrial operations.[24]

## III. THE COMMISSION SHOULD ALLOCATE 24 GHz SPECTRUM TO BSS FEEDER LINKS

### A. DIRECTV Supports the Commission's Proposal To Make A Corresponding 24 GHz Band Allocation For BSS Feeder Links To Facilitate Reverse-Band BSS Service At 17 GHz

Given the public interest in encouraging the deployment of next-generation BSS systems, the Commission should concurrently allocate feeder link spectrum for BSS operations at 24 GHz to support the proposed 17 GHz allocation. As with the 17 GHz band, this allocation should commence today, even if BSS operators do

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23 *See* DIRECTV Petition at 9.

24 At 12 GHz, the Commission provided for a five-year transition period for 12 GHz terrestrial users to other bands, after which time any remaining 12 GHz licensees became secondary to the DBS service. Such relocation of existing 12 GHz users was deemed necessary by the Commission "because of the likelihood of interference that terrestrial use would cause to DBS service if both were operating in the same geographic area." *12 GHz Public Notice* at 1.

not begin using the band until 2007, in order to facilitate investment in and planning of BSS systems.

In this regard, the Commission has proposed that BSS feeder links at 24.75 - 25.05 be co-primary with the Radionavigation service and the FSS.[25] DIRECTV does not oppose a co-primary designation for existing Radionavigation operations, but proposes that the allocation be primary for BSS operations only on a going-forward basis, effective as of the date of the *Notice*. The Commission has indicated that the only current Radionavigation operations in these bands are two FAA Radionavigation radar facilities located near Washington D.C. and Newark, N.J. that will be decommissioned as of January 1, 1998 and January 1, 2000, respectively.[26] Thus, an exclusive primary BSS allocation at these frequencies should not be problematic.

With respect to the compatibility of BSS feeder links with the DEMS service, DIRECTV acknowledges that the full Commission recently has affirmed the relocation of DEMS operations to 25.05 – 25.25 GHz.[27] While DIRECTV does not oppose co-primary status with the DEMS service at 25.05 - 25.25 GHz, as proposed in the *Notice*,[28] DIRECTV now is designing its expansion system to use only the 24.75 – 25.05 GHz frequencies for its feeder link operations. Thus, DEMS should pose no interference concerns regarding DIRECTV's proposed use of 24.75 - 25.05 GHz frequencies; DIRECTV's BSS operations at 24.75 - 25.05 GHz will not conflict with DEMS or any other terrestrial service because those frequencies are not allocated for terrestrial use.

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25 *Notice* at ¶ 80.

26 Amendment of the Commission's Rules to Relocate the Digital Electronic Message Service, 12 FCC Rcd 3471 (1997), at ¶ 15.

27 Amendment of the Commission Rules to Relocate the Digital Electronic Message Service from the 18 GHz Band to the 24 GHz Band and to Allocate the 24 GHz Band for Fixed Service, ET Docket No. 97-99, *Memorandum Opinion and Order* (rel. July 17, 1998).

28 *Notice* at ¶ 80.

## IV. IT IS NOT PREMATURE TO BEGIN PLANNING FOR THE USE OF THE 17 AND 24 GHz BANDS FOR BSS OPERATIONS

As long as the Commission provides the necessary certainty to the DBS industry in the form of exclusive primary allocations of spectrum to support "reverse band" BSS operations in the 17 GHz and 24 GHz bands, as discussed above, DIRECTV does not take issue with the Commission's tentative decision to consider orbital spacing and other service rule issues in separate proceedings.[29] However, DIRECTV strongly disagrees with the Commission's view that initiating consideration of such issues in the near term is "premature."[30]

Indeed, in addition to the present spectrum allocation, technical planning for the use and licensing of these bands to support BSS operations should begin now. Satellite system planning, financing, technology development, and ground system design typically take five years or more -- meaning that BSS operators should be licensed to use these bands no later than 2002. (This proceeding, of course, will at the earliest be concluded some time in 1999.) A processing round typically takes 1-2 years, as does the promulgation of service rules, which in this instance will likely address novel issues.[31] There will also be issues of coordination for the Commission to resolve with its counterparts in Canada, Mexico and elsewhere.

The bottom line is that the Commission need not and should not wait to begin on-the-record consideration of the issues affecting, and the service rule and licensing requirements for, reverse band BSS operations. Given the lead times necessary

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29 *Id.* at ¶ 82.

30 *Id.*

31 For example, as mentioned in its rulemaking petition, DIRECTV believes that there would be a number of public interest benefits associated with Commission adoption of a 4.5 degree orbital spacing policy in licensing BSS space stations to operate at 17 GHz (downlink), including at least doubling the available spectrum resource available for U.S. service under the Planned BSS Band.

for sound spectrum management system licensing, international coordination and careful satellite system construction and deployment, nine years is not nearly as long as the *Notice* suggests with respect to initiating consideration of such issues.

## V. KA BAND ISSUES

### A. GSO Systems Should Receive At Least 1000 MHz Of Unencumbered Spectrum At Ka Band

From the early phases of the 28 GHz proceeding, the Commission has recognized that the then-proposed, and now-licensed, GSO FSS satellite systems would require access to at least 1000 MHz of Ka band spectrum, in order to provide high capacity service to the broadest possible segment of users through very small satellite terminals that can be deployed ubiquitously.[32] Nothing has occurred in the past five years to change that requirement. In fact, the demand for Ka band service to small terminals is clearly demonstrated by the rapid proliferation of VSAT systems at Ku band.

The inherent technical benefits of the Ka band will support the growing demand for high capacity communications, which require more bandwidth than is typically used today on C and Ku band satellites. DIRECTV agrees with its affiliated companies and the GSO industry, however, that the ability to provide service through small, affordable earth terminals is critical to meeting that need. Just as the six-foot C band receive-only antennas of old have been superseded by the current 18-inch DBS antennas, the large gateway terminals in isolated areas originally used in telecommunications businesses are being superseded by ubiquitous 1- to 2- meter Ku band antennas that are common today. There is no reason to believe that the trend at Ka band will be toward anything other than 0.66 m (26-inch) antennas that consumers can

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32 *See, e.g.,* In the Matter of Rulemaking to Amend Parts 1, 2, 21 and 25 of the Commissions Rules to Redesignate the 27.5 - 29.5 Frequency Band, to Reallocate the 29.5 - 30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services, 11 FCC Rcd 53, 73 ¶¶ 54-55 (1995).

install at homes, schools or businesses. Accordingly, DIRECTV supports the allocation of 1000 MHz of clear spectrum for GSO FSS operations at Ka band.

### B. The Commission Must Ensure That Blanket Licensing Rules Imposed At Ka Band Do Not Restrict Non-VSAT Uses Of That Spectrum

DIRECTV supports the proposals of its affiliated Hughes entities with respect to the Commission's Ka band blanket licensing proposals. DIRECTV's particular and primary concern, however, is that the Commission not impose a "one-size-fits-all" set of restrictions that would govern the use of the Ka band by both VSAT and non-VSAT systems, such as systems that may utilize the Ka band for DTH use.

Specifically, VSAT systems operating at Ku band today have their own particular rules, PFD levels and blanket licensing requirements. These systems operate in the same frequency bands as FSS DTH systems, such as PRIMESTAR, for example, which transmit to receive-only dishes that require no blanket licensing, and which are not subject to VSAT rules.[33] (The same is true for DIRECTV at 12 GHz, which similarly is not constrained by blanket-licensing requirements for its ubiquitously deployed 18-inch receive-only dishes or downlink power levels.) The Commission has declined to impose a "standard" frequency and polarization plan for Ku band spacecraft, and instead has left such matters to satellite operators as a matter of coordination with adjacent licensees.

That paradigm should be adopted at Ka band as well. The Commission's proposals in the *Notice* seem to presuppose that VSAT-type restrictions are the only rules that are appropriate for consideration at Ka band. With respect to downlink PFD values, for example, the Commission proposes that a maximum downlink PFD threshold of -120 dBW/m2/MHz averaged over any contiguous 40 MHz band segment, and -118

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33 DIRECTV acknowledges that certain power limits on non-VSAT uplink antennas are imposed under Section 25.212 of the Commission's Rules.

dBW/m2/MHz in any 1 MHz band, not be exceeded by GSO FSS space stations seeking to operate in the 18.3 - 18.55 GHz and 19.7 - 20.2 GHz bands.[34] While such limits might be acceptable for VSAT-type operations at Ka band, it does not necessarily follow that there should be any such downlink power limits for other types of Ka band operations. In any event, just as at Ku band today, operators of DTH systems at Ka band should not be subject to downlink power limits, and should be permitted to freely coordinate higher power limits with adjacent systems.

Indeed, it is clear that the downlink power limits proposed in the *Notice* will not accommodate DTH uses. A downlink PFD threshold of –120 dBW/$m^2$/MHz is equivalent to a satellite EIRP of approximately 56.2 dBW/24 MHz. Since this threshold is proposed for the average over any contiguous 40 MHz, an additional 0.6 dB can be added to the satellite EIRP due to the 5 MHz guardband between transponders (assuming the same band plan as the current BSS band at 12.2 - 12.7 GHz), thereby increasing the per-transponder EIRP to 56.8 dBW/24 MHz.

Existing DBS downlinks in the 12.2 - 12.7 GHz BSS band currently use satellite EIRPs in excess of 56.8 dBW to serve southeast CONUS. Increased rain attenuation in the 19.7 - 20.2 GHz band will necessitate even higher EIRPs to provide comparable DTH service at Ka band. Even allowing for slightly larger receive antennas and the use of a lower convolutional coding rate, the required satellite EIRP to achieve 99.8% availability of DTH service to subscribers is greater than 59 dBW per 24 MHz transponder. This translates to PFDs in excess of –117.8 dBW/$m^2$/MHz.

Attachment A, Generic DTH Digital Television Link Budget, shows the required satellite EIRP for Miami to achieve 99.8% DTH service availability using a 66-cm receive antenna and a 2/3 convolutional coding rate. Given the advances of today's satellites, DIRECTV believes that, with shaped reflectors and TWTA power doubling,

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34 *Notice* at ¶ 59.

transponder EIRPs of 60 dBW are possible.

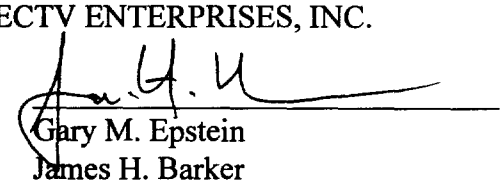
Accordingly, while DIRECTV sees no reason to impose any PFD limit at all upon Ka band DTH operations, it is plain that the VSAT-inspired limit proposed in the *Notice* will not accommodate such uses. It would be extremely short-sighted of the Commission to foreclose such uses, given that the true service possibilities of these frequencies are still being developed by the GSO industry. At a minimum, if PFD coordination thresholds are to be imposed on DTH services at Ka band, DIRECTV urges that a value of $-116$ dBW/m$^2$/MHz be adopted.

## VI. CONCLUSION

DIRECTV urges the Commission to allocate spectrum, and to adopt changes to its rules, consistent with the positions set forth above.

Respectfully submitted,

DIRECTV ENTERPRISES, INC.

By: 

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November 19, 1998

ATTACHMENT A
GENERIC DTH DIGITAL TELEVISION LINK BUDGET (Miami)

| **Uplink** | **Clear** | **Rain Up** | **Rain Down** |
|---|---|---|---|
| Transmit EIRP, dBW | 76.7 | 88.1 | 76.7 |
| Ground pointing loss, dB | -0.1 | -0.1 | -0.1 |
| Uplink path loss, dB | -213.3 | -213.3 | -213.3 |
| Atmospheric loss, dB | -1.2 | -1.2 | -1.2 |
| Uplink rain loss, dB | 0.0 | -18.2 | 0.0 |
| Satellite G/T, dB/K | 2.0 | 2.0 | 2.0 |
| Bandwidth, dB-Hz | -74.0 | -74.0 | -74.0 |
| Boltzmann's constant, dBW | 228.6 | 228.6 | 228.6 |
| **Uplink C/N (thermal), dB** | 18.7 | 11.9 | 18.7 |
| **Downlink** | | | |
| Satellite EIRP, dBW | 59.8 | 59.8 | 59.8 |
| Downlink path loss, dB | -209.8 | -209.8 | -209.8 |
| Atmospheric loss, dB | -1.2 | -1.2 | -1.3 |
| Downlink rain loss, dB | 0.0 | 0.0 | -11.8 |
| Rain temp increase, dB | 0.0 | 0.0 | -2.8 |
| Ground receive pointing loss, dB | -0.3 | -0.3 | -0.3 |
| Ground G/T, dB/K | 18.3 | 18.3 | 18.3 |
| Bandwidth, dB-Hz | -74.0 | -74.0 | -74.0 |
| Boltzmann's constant, dBW | 228.6 | 228.6 | 228.6 |
| **Downlink C/N (thermal), dB** | 21.4 | 21.4 | 6.7 |
| **Totals** | | | |
| Uplink C/N (thermal), dB | 18.7 | 11.9 | 18.7 |
| Downlink C/N (thermal), dB | 21.4 | 21.4 | 6.7 |
| Crosspol interference, dB | 18.9 | 16.8 | 16.6 |
| Adjacent satellite interference, dB | 14.6 | 14.6 | 14.6 |
| Total C/(N+I), dB | 11.7 | 8.9 | 5.5 |
| Total Eb/(N+I)o | 11.6 | 8.8 | 5.4 |
| Required Eb/(N+I)o | 5.4 | 5.4 | 5.4 |
| Margin, dB | 6.2 | 3.4 | 0.0 |

**DECLARATION OF PAUL R. ANDERSON**

I, Paul R. Anderson, hereby declare as follows:

1. I am Director, Communications Systems for DIRECTV Enterprises, Inc. I am an engineer by training and am familiar with the technical and interference characteristics of DIRECTV's Direct Broadcast Satellite system, the technical requirements of the Commission's rules, and the interference and technical issues referenced in the foregoing petition.

2. I have reviewed the foregoing filing from a technical perspective, and the information found therein is true and accurate to the best of my knowledge, information and belief.

Paul R. Anderson
Director, Communications Systems
DIRECTV Enterprises, Inc.

November 19, 1998